

Visualization of Dynamic Volcanic Phenomena: The Advance of Lava Flows in the Kamoamo Flow Field, Kilauea Volcano, Hawaii

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A deployment of the NASA C-130 remote sensing research aircraft to Kilauea Volcano in September of 1995 coincided with a period of renewed surface activity on the Kamoamo flow field. This activity was documented with visible, near infrared and thermal infrared imagery acquired between September 3 and 17. We have used these data, together with a digital elevation model of Kilauea, to create an animation of the flow field activity.

The time history of multispectral imagery allows us to visualize changes in the temperature of the active lava flows. The combination of image and elevation data allows us to visualize interactions between the local topographic gradient and the velocity and morphology of the flows. The same animation techniques can be applied to maps of derived geophysical parameters, such as temperature, providing a means to formulate and validate models of thermal and fluid dynamic processes in active flows.

The NASA Earth Observing System will generate large volumes of time history data over the next 10 to 15 years. Our animation demonstrates that commercial, off the shelf software and PC-based workstations can be used to produce scientific visualizations from such data. However, to derive the full scientific value from time history data sets, we must develop data analysis tools that allow us to interact with the animations.